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News Bulletin of
The Entomological
Society of Victoria
inc.

THE ENTOMOLOGICAL SOCIETY OF VICTORIA (Inc)

MEMBERSHIP

Any person with an interest in entomology shall be eligible for Ordinary membership. Members of the Society include professional, amateur and student entomologists, all of whom receive the Society's News Bulletin, the Victorian Entomologist.

OBJECTIVES

The aims of the Society are:

(a) to stimulate the scientific study and discussion of all aspects of entomology,
(b) to gather, disseminate and record knowledge of all identifiable Australian insect species,
(c) to compile a comprehensive list of all Victorian insect species,
(d) to bring together in a congenial but scientific atmosphere all persons interested in entomology.

MEETINGS

The Society's meetings are held at Clunies Ross House, National Science Centre, 191 Royal Parade, Parkville, Victoria, at 8 p.m. on the third Friday of even months, with the possible exception of the December meeting which may be held earlier. Lectures by guest speakers or members are a feature of many meetings at which there is ample opportunity for informal discussion between members with similar interests. Forums are also conducted by members on their own particular interest so that others may participate in discussions.

SUBSCRIPTIONS

Ordinary Member	$20.00
Country Member	$16.00 (Over 100 km from GPO Melbourne)
Student Member	$12.00
Associate Member	$ 5.00 (No News Bulletin)

No additional fee is payable for overseas posting by surface mail of the news bulletin. Associate Members, resident at the same address as, and being immediate relatives of an ordinary Member, do not automatically receive the Society's publications but in all other respects rank as ordinary Members.

Cover Illustration by Jenny Browning, 1992
Ogyris sp (♀) from Lake Douglas, near Kalgoorlie, WA

MINUTES OF GENERAL MEETING, 21ST AUGUST 1992

The President, R. Field opened the meeting at 8.03 p.m.

Present: J. Burns, P. Carwadine, P. Cole, M. & P. Coupar, I. Endersby, I. Faithfull, A. & E. Farnworth, R. Field, M. & B. Hunting, P. Kelly, G. Krake, M. Malipatil, S. Smith, D. Smith-Thompson, D. & N. Stewart, B. Vardy

Apologies: K. Clark, D. Crosby, D. & J. Holmes. T. New, K. Walker

Minutes: Minutes of the April meeting (*Vic. Ent.* 22:57-58) were received. (Stewart/Malipatil). Carried.

The President then introduced the guest speaker for the evening, Mr Peter Cole. The subject of Peter's talk was "Parasitoids of Noctuid Moths". Peter supported his talk on the biological control of noctuids with slides showing the larval damage to cereal and fruit crops. He presented the results of field trials with illustrations of several biological control agents which attack the eggs, early and late instars of noctuid larvae.

Ross Field proposed a vote of thanks to the speaker.

Correspondence: to be tabled at October General are:
- Circular Ent. Soc. NSW, and
- Society for Insect Studies

Treasurer's Report:

1. General Account:
   SBV Bank Account $ 2475

2. Le Souef Award Account
   SBV Bank Account $ 733
   Term Deposits due 14.6.95 $ 1400
   $ 2133

3. Junior Encouragement Award
   SBV Bank Account $ 471

4. Membership

Country	68
Metropolitan	45
Student	5
Life	2
	120
Associate	6
	126
Subscribers	12
1992 Subscriptions unpaid	17

Moved I. Endersby, seconded B. Vardy. Carried.

Editor's Report: Mali Malipatil requested more articles for the next news hulletin.

Excursions: Peter Carwadine provided details of two excursions which are planned for the forthcoming collecting season:

1. Halls Gap at the Grampians
   31st October to 1st November, 1992

2. 19km north of Licola - Breakfast Creek
   6th and 7th Fehruary, 1993
   - possihly a joint excursion with the Field Naturalist Botanist Group

General Business:

1. Election of J. O'Dea as member. Carried.

2. Nomination of Richard Faulder as member to be put to October meeting.

3. Nomination of D.F. Croshy as Honorary Life Member to be put to the October meeting.

4. Forthcoming book: "Flying Colours" $17.95. Mike Coupar spoke to flier to new book published by NSW University Press.

5. Beetles of South Australia
   Peter Kelly spoke to series of books from the South Australian Museum.

6. Exhibits: Stephen Smith spoke on the earwig-like *Heterojapyx* (Heterojapygidae) which Daniel Smith-Thompson collected from beneath logs at the Otways.

   Arthur Farnworth advised that Max Moulds is requesting Victorian cicadas.

The President thanked members for their attendance and closed the meeting at 9.26 p.m.

MINUTES OF COUNCIL MEETING, 18 SEPTEMBER 1992

The Vice-President, P. Carwardine, opened the meeting at 8.05pm.

Present: P. Carwardine, D. Dobrosak, I. Endersby, M. Hunting, M. Malipatil, K. Walker, B. Vardy.

Apologies: R. Field.

Minutes: Minutes of the July Council Meeting (*Vic. Ent.* 22(4): 79-81) were passed. (Malipatil/Dobrosak).

Correspondence: Detailed and received. (Endersby/Vardy)

Treasurer's Report: Financial Statement as of 18 September 1992 was received from I. Endersby as follows:

General Account	$2141
Le Souef Award Account	$2136
Junior Encouragement Fund	$ 491

Membership:	
Country	62
Metro	37
Student	4
Life	2
Joint	5
Total	110

Subscribers	12

Non-financial members deleted from mailing list under Rule 6(a) for non-payment of dues are listed below:

Mr John Burns
Mr Marc Coombs
Ms Elsa Dexter
Dr John Edgar
Mr K.D. Fairey
Mr I Greig
Dr R. & Mrs J Horne
Mr P Hutchinson
Mrs D. Johnston
Mr A.R. Martin
Mrs G. Mayo
Dr Shane McEvey
Mr David McLaren
Mr A.M. Smith
Mr J. Wertz

Ian Endersby also produced documentation on income, expenditure and expected surplus for 1992. This information has been placed on a spreadsheet to allow the society to monitor its monthly financial situation and predict the 1993 situation.

Other matters included a letter from Trevor Hawkeswood (addressed to the editor) enclosing part subscription dues for 1992, and a further follow up to Ken Fairey for non-payment of back issues of the *Vic. Ent.*.

Report accepted Endershy/Vardy.

Editor's Report: Kelvyn Dunn has recently moved to Queensland but will continue his editorial role. Mali Malipatil reported there were sufficient articles in hand for the next issue hut nothing in reserve.

Excursions: Peter Carwardine had no additional information on the proposed excursions due to lack of responses from the sites concerned. Ross Field communicated to the meeting that National Parks will not require the Society to obtain additional permits as long as a member on the excursion had a current permit to collect in those areas.

General Business: (1). A request has been received to provide Clunies Ross House with our 1993 calender. Ken Walker will provide such dates. A motion was moved as follows:

"When the April meeting date conflicts with the Easter Holiday period, the Friday before Easter will be booked." Vardy/Endershy. Passed.

(2). Subcommittee reports (ENTRECS, Conservation and Zoo LeSouef Award) on the terms of reference, operating procedures and nominated convenors were tabled. Discussion ensued, however it was agreed to circulate the documents to all council members with a view to fully debating the reports and accepting and puhlishing final recommendations from the November council meeting.

(3). A request for raw data from the ENTRECS datahase was discussed at length. Council reiterated its decision not to release raw data.

(4). Ian Endershy reported on his investigation into council making funds availahle from the Junior Encouragement Fund to bursaries for the Science Talent Search 1993. His assessment was favourahle demonstrated hy the list of 1990 bursary winners which included eight projects with entomological themes. He proposed the following motion:
"That Council allocates $50 from the Junior Encouragement Fund to the sponsorship of Bursaries for the 42nd Science Talent Search in 1993, recognising that the adjudicators will endeavour to make the awards to entomological projects hut cannot guarantee that a project of a sufficient standard will be submitted." Endersby/Vardy. Passed.

The meeting closed at 9.28pm.

RECORDS OF NATIVE DUNG BEETLES *ONTHOPHAGUS PEXATUS* HAROLD, *O. AURITUS* ERICHSON AND *O. GRANULATUS* BOHEMAN (COLEOPTERA: SCARABAEIDAE) AT DOG SCATS AND THEIR POTENTIAL FOR BIOCONTROL OF DOG DUNG

Ian Faithfull, 7/20 Adam Street, Burnley, Vic. 3121

Abstract. The occurrence of the native dung beetles *Onthophagus pexatus* Harold, *O.auritus* Erichson and *O.granulatus* Boheman (Coleoptera: Scarabaeidae) in dog (*Canis familiaris* L., Canidae) scats in suburban Melbourne and rural Victoria and of unidentified *Onthophagus* species in dog dung in Sydney and Canberra is reported. Problems of dog faecal pollution in urban environments are discussed and the possibility of using *Onthophagus* species in biological control of dog dung is examined.

Observations

Swindley (1991) reported the finding of four small adult *Onthophagus* in one day old dog (*Canis familiaris* L., Canidae) droppings in suburban Sydney, New South Wales. The beetles were in a very soft pad deposited on a back lawn at West Ryde. Two specimens were collected but they have not been identified to species level. The other two dug into the soil,a typical garden loam. No examination was made for existing burrows (Swindley, pers.comm.). There appear to be no previous published records of *Onthophagus* from dog scats in Australia.

Faithfull (1992) recorded *O.auritus* Erichson, *O.mutatus* Harold and *O.posticus* Erichson from scats of foxes (*Vulpes vulpes* L., Canidae) in Victoria, this being the only other carnivore whose scats have been recorded in the literature as harbouring native *Onthophagus*.

On 15 February 1989 at 2 pm ESST at a rural site 5.5 km east of Tolmie, northeast Victoria, three species of native *Onthophagus* were found in a large domestic dog scat in long grass away from trees near a house. The scat contained no hair or bone fragments, was of uniform texture and was approximately two days old. It was almost certainly produced by a full grown female Rhodesian ridgeback, weighing approximately 30 kg, whose diet usually included tinned and pelleted market preparations, largely meat, supplemented with roughly 25% kitchen scraps and boiled vegetable offcuts. Three specimens of *O.pexatus* Harold were collected from the dung, while *O.auritus* Erichson and *O.granulatus* Boheman were identified in the dung but not collected. The beetles had actively tunnelled in the scat, but tunnels in the soil under the dung were not observed.

On 1 March 1992 a single male *O.auritus* was found in dog faeces at Wattle Park, Burwood, (Melbourne) Victoria. The dry, hard dung, an estimated 7 to 10 days old, had the textural and compositional characteristics of faeces resulting from a typical domestic dog diet and contained some bone fragments and a small quantity of short pale hairs, possibly those of the animal which produced it. The dung was on a thin discontinuous layer of *Eucalyptus* leaf and bark litter over sand. No evidence of burrowing was found in the sand beneath the dung.

Moulds (pers.comms.) has reported that dung beetles work on dog faeces in his suburban

yard at Waitara (Sydney). The species involved have not been identified. They seem to cease activity during hot dry weather and in winter and were not active during the late autumn of 1992.

An officer of Manly Council (Sydney)(Swindley, pers.comm.) has reported that beetles used to bury his dog's droppings. The CSIRO Division of Entomology (Tyndale-Biscoe, pers.comm.) has frequently received calls from people who have seen "dung beetles" working dog dung in their gardens and Tyndale-Biscoe (pers.comm.) has "often seen different species of *Onthophagus*, both native and introduced, in dog and fox droppings" and believes that if the dung is moist enough, any small species will go into it. CSIRO has not however collated separately the records from dog dung, and individual specimens in their collections would need to be examined to determine the species involved and to gather other relevant data (Tyndale-Biscoe per T.Weir, pers.comm.).

Discussion

It is generally believed that adults of coprophagous Australian *Onthophagus* utilise whatever dung is available (Matthews, pers.comm.; Tindale-Biscoe, pers.comm.). But a few scarabaeines do specialise in the dung of particular animals (Waterhouse 1974) and little is known about the adult and larval food requirements of Australian species (Matthews 1972). Ecological factors other than dung type seem to be more important in defining the niches of *Onthophagus* species (Matthews pers.comm., Waterhouse 1974).

If some native dung beetles regularly inhabit dog dung, carry it into underground feeding burrows and use it as a food supply for their larvae, there could be a benefit from the introduction of suitable species to urban environments heavily contaminated with dog droppings. Many western cities are subject to problems resulting from dog defecation in gardens and streets, and Paris is perhaps the most infamous. The city has the highest density of dogs of any in Europe. Ten tonnes of "poodle-doo" are deposited on Parisian streets each day, over $10 million per year is spent cleaning it up and 650 people per year require hospitalisation after slipping on fouled pavements (Tuohy 1992). Australian cities have a somewhat different range of problems.

The greater Melbourne catchment has an estimated 450,000 dogs which deposit an estimated 90 tonnes of faeces per day (Rooney & Bell 1991). This results in a number of problems including pollution of nature strips and parkland, and streams, rivers and swimming beaches when heavy rains flush faecal material from the catchment into the storm water system (Rooney & Bell 1991, Young 1991). "No data exist to indicate even approximate faecal loads from non-human sources" in storm water but input is certainly "significant and difficult to control" (Rooney & Bell 1991) and far exceeds sewerage leaks (Young 1991). In the municipalities adjacent to Port Phillip Bay the registered dogs alone produce 12.7 tonnes of faeces per day. Rooney & Bell (1991) consider it "debatable whether controlling dog defecation will produce measurable improvements in quality of runoff" and argue that experimental work is required to answer this question.

Research indicates that a figure for overall dog numbers is not readily available for Sydney, however a telephone survey conducted by Swindley (pers.comm.) of several metropolitan municipalities produced the following figures for registered animals: Sydney City 92, Manly 1,900, Woollahra c.1,800, Leichardt c.3,500, Baulkham Hills c.9,800, Blacktown c.16,000 and Ryde c.5,000. Assuming these areas are representative of dog ownership throughout the city

and that about one third of dogs are unregistered (Melbourne estimates, Rooney & Bell, 1991) we have obtained a very rough estimate using (outdated) census data (Australian Bureau of Statistics 1983) that the urban dog population of the Sydney Statistical Division, excluding Gosford-Wyong Subdivision, is around 300,000, and these animals would produce (using the 200/day estimate of Rooney & Bell 1991) approximately 60 tonnes of faeces per day. It is well known that Sydney already has significant water pollution problems resulting from inadequate management of human sewage and it seems clear that like Melbourne it must have a significant problem with the wastes of dogs.

Investigations in Melbourne indicate that *Onthophagus* are rarely found in dog scats in the inner and middle suburbs, including such places as Collingwood Children's Farm, Abbotsford (observations 1984 to 1988) where suitable habitat occupied by large grazing animals (but not cattle) occurs. They are never seen at lights or in light traps. Perhaps the herbivore dung resource at the Collingwood Farm is too small to provide adequate habitat for establishment of natural immigrants. However if dog faeces really are suitable food for *Onthophagus* adults and larvae it might be expected that they would be found more frequently in it, and because the resource is available throughout the suburbs, the dog scat feeding species could naturally extend their range through suitable metropolitan areas. Other ecological factors, in particular relating to ground surface cover (the prevalence of concrete and asphalt) and soils, and their suitability for burrowing, probably mitigate against the establishment of *Onthophagus*. Many of these beetles are nocturnal and are attracted to artificial lights, another hostile feature of the urban environment. In addition, like many large insects, they are killed on the roads (personal observations).

The three species so far identified from dog dung in south-eastern Australia appear to be mainly diurnal with a preference for open areas: *O.auritus* is a diurnal species usually found in "well shaded" areas such as forests and woodlands on sandy and loamy soils, while *O.pexatus* frequents "dry, fully open areas" and *O.granulatus*, also diurnal, is found in "pastures and other open areas with sandy soil" (Matthews 1972). These species might be suitable for introduction into urban areas where dog dung is a problem.

The benefits of dung burial by dung beetles include reduction in the number of flies which breed in the dung, enrichment of soils and control of parasites carried in the dung, as well as the pollution control referred to above. The well known CSIRO programme to introduce foreign dung beetles for biological control of bovid dung in Australia has had demonstrable economic and other benefits. It is conceivable that a similar programme directed at control of dog dung could also have significant benefits. However too little is known about the existing extent of such control and the biology of the species involved to suggest whether such a programme could be effective: it seems unlikely, at least for Melbourne.

Conclusion

Native and introduced *Onthophagus* probably colonise dog dung throughout south-eastern Australia and the adults feed on the faeces. But there are no observations of use of the dung for breeding. The extent of biological dung control achieved appears to be small but burial of scats has been noted in Sydney. In urban environments the detrimental effects of dog defecation are numerous and it is possible that economic benefit could result from enhanced dung beetle activity. Future studies of *Onthophagus* should aim to discover if any species use dog dung as a larval food, to what extent they are effective in dog dung disposal, in what

conditions the beetles are active and what factors are limiting their dispersal into and within urban areas.

The Victorian specimens are in the private collection of the author while Swindley's specimens are in the collection of the Biological and Chemical Research Institute, Department of Agriculture & Fisheries (NSW), Rydalmere.

Acknowledgments

I am particularly grateful to Mr F.Swindley of Sydney for details of his observations, and those of others, for useful advice and criticism and for the results of his research on dog numbers in Sydney. Thanks are also due to Dr G.R.Brown of the NSW Department of Agriculture and Fisheries, Dr E.G.Matthews of the South Australian Museum for predraft critical comment and *Onthophagus* species identifications, Mr M.S.Moulds of the Australian Museum for details of his observations, Dr M.Tindale-Biscoe of the CSIRO for personal observations and advice on the CSIRO collections, the Environment Protection Authority (Victoria), and officers of Sydney municipal councils for the information on dog populations given to Mr Swindley.

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Tuohy, W., 1992. It's easy to put your foot in it. Parisian dog owners are being told to clean up their act or face fines. *The Age (Extra)* (Melbourne), 4 April, p.12

Waterhouse, D.F., 1974. The biological control of dung. *Scientific American* **230**:100-9.

Young, L., 1991. Rains flush dogs' doings into bay. *The Age* (Melbourne), 19 Decemher, p.6

NOTES ON THE OCCURRENCE OF *RHIPICERA FEMORATA* (KIRBY) (COLEOPTERA:RHIPICERIDAE) NEAR SHEPPARTON, VICTORIA

Graeme J. Krake
18 Nymph Street, Mitcham, Vic. 3132

The Feather-Horned beetle *Rhipicera femorata* (Kirby) is one of only 13 species (Lawrence & Britton 1991) known to Australia and is the only species of the genus to occur in all South-Eastern States, and Queensland (Hawkeswood 1987, Moore 1987). Although this species is apparently commonly collected at light (Matthews 1984) during summer, little is known of its life history and behaviour (Hawkeswood 1987, Moore 1987). I therefore thought, that my recent observations could only add to our knowledge of the species.

On 22 March 1992, between the hours of 8 a.m. and 9 a.m. the beetle *Rhipicera femorata* was observed in numbers on grass, sedge and rush, near Shepparton in northern Victoria. Unfortunately, only limited observations were made due to time restraints.

The location was an area of typical river woodland lying between the Goulburn River and nearby swamp. The trees in evidence were mainly River Red Gum (*Eucalyptus camaldulensis* Dehnh.) and Grey Box (*E. microcarpa* (Maiden) Maiden), together with stands of Silver Wattle (*Acacia dealbata* Link). The swamp area was mostly dry due to low rainfall over the preceding spring and summer. The previous week had seen temperatures in the low to mid 30°C. Prior to this period, the weather had been mild for late summer.

The specific collection site was an area of approximately 250 square metres, which was densely covered with common Wallaby Grass (*Danthonia sp.*), Thread Rush (*Juncus flavidus* L. Johnson), and common Tussock Grass (*Poa labillardieri* Steudel).

The beetles were observed clinging to the higher stalks of the sedge, rush and grass. Although an initial stroll through the area revealed few beetles, within half an hour the number had noticeably increased. The number of beetles collected on each tussock was hard to determine, as collections were made on successive sweeps through the area. As beetles continued to appear on growth that had previously been checked, and because no beetles were observed in flight, I assumed that they had climbed up from the denser bases of the tussocks. The beetles had either been sheltering there from the previous night or had recently emerged from their pupal state.

Approximately two-thirds of the 60 plus beetles observed were collected. The sampled specimens showed a male/female ratio of 8:1, which supports previous collection data, in that few females have been collected (Moore 1987). The size of the males varied from 13-19mm in length, while the females measured between 12.5 and 17mm.

A cursory check of similar tussocks within the immediate vicinity of the sampled area, revealed what seemed to be a similar distribution of the beetles.

Hopefully, if the beetles can be relocated in the same situation next season, more detailed observations can be made with the expectation of expanding our rather limited knowledge of the life history of this beetle.

Larval Rhipiceridae are parasitoids of cicadas in North America (Moore 1987, Lawrence & Britton 1991). Moulds (1990) illustrated a probable larval *Rhipicera* attached to *Cyclochila australasiae*(Don.) (Cicadidae), a large south-eastern Australian cicada.

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A NOTE ON *CISSEIS LATICOLLIS* CARTER (COLEOPTERA:BUPRESTIDAE) FROM QUEENSLAND

Trevor J. Hawkeswood
49 Venner Road, Annerley, Brisbane, Qld 4103

Abstract: A record is made of the jewel beetle *Cisseis laticollis* Carter (Buprestidae) from the Brishane area, Queensland and the first adult host plant, *Acacia leiocalyx* (Domin) Pedley (Mimosaceae) is also recorded for the beetle.

The dull bronze buprestid (jewel) beetle *Cisseis laticollis* Carter was originally described by Carter (1923:169) from specimens collected from Brishane and "Wide Bay", Queensland. Carter did not supply any biological details and nothing since appears to have been written on the beetle.

On 15 December 1983 I collected one mature adult of this beetle from the foliage of a young plant (*ca* 1m high) of *Acacia leiocalyx* (Domin) Pedley (Mimosaceae) from near the Griffith University campus, Brisbane, Queensland. The beetle had been chewing part of a stem of the host plant and became very wary when approached. A large number of *A. leiocalyx* plants were examined in the area and during subsequent years hut no further specimens of this apparently rare species have been collected. The specimen resides in the collection of the author.

Thanks are expressed to Mr T.A. Weir, CSIRO, Canberra for identifying my specimen of *C. laticollis.*

Reference

Carter, H.J. 1923. Review of the genera *Ethon, Cisseis* and their allies (Buprestidae). *Proceedings of the Linnean Society of New South Wales* 48: 159-176.

NEW DISTRIBUTION, FOOD PLANT AND LIFE HISTORY NOTES FOR SOME SOUTHERN QUEENSLAND BUTTERFLIES

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Abstract: New distribution records are given for two skipper butterflies and one lycaenid. Notes on the behaviour of the early stages and a new host plant of *Philiris innotata* (Miskin) are presented.

Tagiades japetus janetta Butler
This species has been shown to be gradually extending its range southward along the Queensland coast toward New South Wales (Dunn & Eastwood 1991). The most southern record given by Dunn & Dunn (1991) was Mary River Heads (30 km NE of Maryborough), which was taken by myself. On 6 December 1991, I observed a male settle under a leaf above my head in the Cooloola National Park. This new locality extends the known southern limit by about 110 km south from River Heads.

Telicota anisodesma Lower
A male and female were taken in December 1991 at Burrum Heads which extends the known range about 58 km north-west from the previous northern most locality of River Heads given in the main text for this species by Dunn & Dunn (1991). In addition, Dunn & Dunn (1991) in the 'New Information' section on p.657 also listed a record from the Deepwater National Park which is north of Burrum Heads. My record is important as it an intervening locality providing evidence for a continuous distribution north to the Deepwater National Park.

Jalmenus evagoras evagoras (Donovan)
A colony of this attractive butterfly was found along the Burrum Heads road, Burrum Heads. Dunn & Dunn (1991) listed this subspecies north to Maryborough but omitted to mention the isolated population at the Kroombit Tops, west of Gladstone which is also this subspecies (Common & Waterhouse 1981), although it was plotted on the map figure (Dunn pers. comm.). My intervening locality serves to provide a minor coastal extension north of Maryborough in an area where the species was not previously known. Larvae were present in November 1991 and later, pupae were found in January 1992. Adults from Burrum Heads closely resemble those from Maryborough.

Philiris innotata innotata (Miskin)
During March 1991, I collected some larvae of this species. As I was unable to obtain more plant material from the original plant, I placed them on another very similar looking deciduous fig, *Ficus coronata*; a rainforest species which can tolerate drought conditions. The larvae later pupated and emerged from late March through to mid April. Some pupae, however, went into diapause and did not emerge until November or December of the same year. These adults emerged during December 1991 and January 1992. During this period of pupal diapause (from late April to early November) the fig tree lost its leaves to cope with the dry season. I anticipate that diapausing pupae probably would be found in the curled dead leaves during that period.

I also noted that during the period of diapause, pupae produced a clicking noise. This noise could often be heard about 2-3 hours after sunset and is the first record of pupal stridulation for this butterfly. Both Common & Waterhouse (1981) and Dunn & Dunn (1991) listed many other Australian butterflies which are known to produce sounds as pupae or mature larvae.

Acknowledgments

I would like to thank Michael Braby, Kelvyn Dunn and Bruce White for their help and advice during the writing of this article. Also Kelvyn Dunn for confirming the subspecific status of my *J. evagoras* population.

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Dunn, K.L. & Dunn, L.E. 1991. *Review of Australian butterflies: distribution, life history and taxonomy.* Parts 1-4. Privately published by the authors, Melbourne.

Dunn, K.L. & Eastwood, R.E. 1991. Range Extension for the butterfly *Tagiades japetus janetta* Butler (Lepidoptera: Hesperiidae) in Queensland. *Australian entomological Magazine* **18**: 91-93.

A NOVEL COLLECTING MEDIUM

Ian D. Endershy
56 Looker Road, Montmorency, Vic. 3094

Introduction

From time to time insects and mites have been recorded on the bodies of dragonflies. Carlow (1992) described phoretic wasps on an adult Texan aeschnid and recalled other examples from the literature. In his revision of the genus *Charletonia*, Southcott (1991) included examples of erythraeid mites ectoparasitic on a libelludid in New Caledonia and on unidentified Anisoptera in South America. Hawking & Watson (1990) report of the first example of an Australian chironomid larvae epizoic on an aeschnid nymph. Each of these examples involved an association that is likely to occur repeatedly even if not obligate.

This note records another association that is purely accidental; the stranding of a true bug on the cuticle of a dragonfly larva, by the surface tension of water.

Observations

In the periods March to April 1991 and December 1991 to April 1992, 115 exuviae of *Hemicordulia tau* have been collected from the margins of a small lily pond in our garden at Montmorency, Victoria, and from surrounding walls and vegetation. It is quite possible that both hatches were the progeny of a singly laying and the delayed development of the later one was due to a low food supply.

Each of the exuviae was examined under 10x and 20x magnification to determine the sex of the adult that had emerged. During these examinations a number of other taxa were found adhering to the exuviae including a dipteran wing, a water snail and unidentified egg masses.

On 25 December 1991, 24 exuviae from adults that had emerged during the previous night were collected and examined. On the fourth sternite of one specimen was a bug about 0.5mm in length. The dorsal surface of the bug was stuck on the exuviae thus revealing its diagnostic mouthparts and patterned abdominal venter. It appeared as though the bug had been stranded by surface tension as the nymph emerged.

Subsequently the bug was identified as an early instar pentatomid (stink bug) nymph. As this is not an aquatic bug it must have been blown or fallen into the pond from surrounding vegetation. It is not possible to assess whether the bug was alive when stranded so we cannot tell if surface tension would be sufficient to catch and hold a live insect.

Because such occurrence is likely to be rare, the dragonfly exuvium has been lodged with the Museum of Victoria with the bug in situ.

Acknowledgments

Thanks are due to Dr Mali Malipatil for identifying the pentatomid and to Mr Ken Walker for arranging the identification.

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NOTES ON EGG-LAYING IN AN AUSTRALIAN STICK-INSECT (PHASMATODEA)

Chris B. Banks
Melbourne Zoo, P.O. Box 74, Parkville, Vic. 3052

The Australian phasmatid *Acrophylla titan* (Macl.) is the longest Australian species of the sub-family Phasmatinae, with females reaching a body length of 25cm (Key 1991). A colony of this species has been maintained at Melbourne Zoo since 1987 and reproduction has been achieved on many occasions. Data on the egg production from a single female was recorded over 10 months in 1990-92.

A female which metamorphosed to adult on 8 Novemher 1990, was placed with an adult male (metamorphosed 20 September 1990) on 10 November. They were maintained in a wood-framed wire gauze box measuring 41 x 52 x 58cm high, in the Zoo's Reptile House at 25-35°C. Bunches of leaves from *Eucalyptus botryoides* Smith, *Callistemon rigidus* R.Br. and *Acacia floribunda* (Vent.) Willd. were provided for food and replaced as necessary. Mist-spraying the fresh leaves and insects stimulated immediate feeding.

Oviposition commenced on 15 November, 1990, and continued until the female died on 7 August, 1991. At the time of death, the female weighed 16.8 g and had a total body length of 18.2 em (abdomen 12.5 cm and head/thorax 5.7 cm). Three males were used during this period, the original individual dying and being replaced on 27 December 1990, and the second individual on 8 March 1991.

A total of 629 eggs was laid, for a mean of 2.3736/day and mode of 2. The maximum laid on a single day was 10 and there were 39 days when no eggs were laid (Figure 1). Daily egg production was higher in the first three months of November-January inclusive ($x = 3.9216$, $SD = 0.8870$), then over the remaining period ($x = 1.7358$, $SD = 0.3555$).

At the time of death, the female had 13 eggs in her abdomen. All were shaped like deposited eggs and shaded from honey-yellow in colour deepest in the abdomen, to the typical dark grey-brown closest to the tip of the ovipositor.

Egg morphology and size were as given by Key (1991), and egg production was within the range for the order (Key 1990, Preston-Mafham 1990). Eggs were incubated on fine grey sand in petri dishes in an incubator at 27-31°C. They hatched after 90-110 days and further data are being gathered on varying incubation techniques and temperatures.

Acknowledgments

Alan Yen provided constructive comments on the original draft.

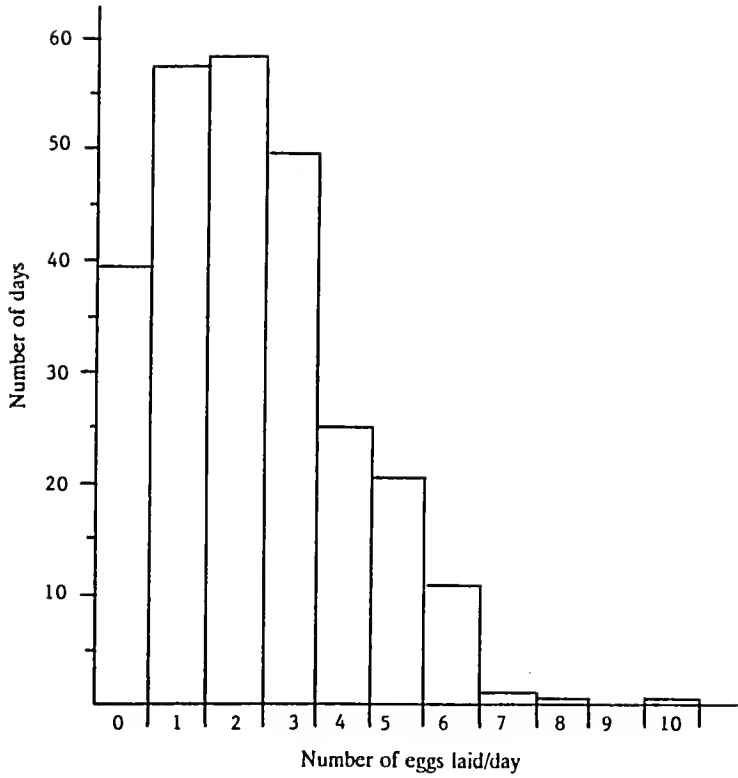

Figure 1. Number of eggs laid by an *Acrophylla titan* at Melbourne Zoo from November 1990 - August 1991.

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PARASITOIDS FOR THE CONTROL OF *HELICOVERPA* IN EASTERN AUSTRALIA

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Abstract. Research on biological control of *Helicoverpa* (Hubner) at the Institute of Plant Sciences, Burnley is outlined. Rearing methods for the exotic *Helicoverpa* parasitoids, *Cotesia kazak* (Telenga) (Braconidae) and *Hyposoter didymator* (Thunberg) (Ichneumonidae) are described and the releases of these species in Victoria detailed. Rearing methods and research on the biological control potential of the native noctuid egg parasitoid *Trichogramma* nr *ivelae* (Pang & Chen) (Trichogrammatidae) are described.

Introduction

Helicoverpa (Hubner) are members of the family Noctuidae which includes several species of moths which are serious pests of crops and pastures throughout eastern Australia. *Helicoverpa punctigera* (Wallengren) and *H. armigera* Hubner are two important budworms which attack broad-leaf crops. Although both species occur on many crops, in Victoria *H. punctigera* is the predominant species on crops such as field peas and tomatoes, whereas in Queensland *H. armigera* is the predominant species on crops such as sorghum, maize and wheat (Murray, *et al.* 1992). The natural enemies of noctuid moth larvae are therefore important to agriculture as they may reduce the economic impact of these pests.

A number of native parasitoids of noctuids are recorded from eastern Australia (Gauld 1984, Chadwick & Nikitin 1985, McDonald & Smith 1986) and collections of at least fifteen hymenopteran and nine dipteran parasitoids are held at the Institute of Plant Sciences (IPS), Burnley. Members of the families Braconidae and Ichneumonidae comprise most of these Hymenoptera, while all the Diptera are Tachinidae. Eight of these species were reared from *Helicoverpa*, however only two destroy their hosts before they are capable of causing significant crop damage. The remaining six kill their host at a mature larval or pupal stage, after the host has completed its damaging feeding.

In an effort to control *Helicoverpa* in eastern Australian cropping regions the Institute of Plant Sciences is investigating two exotic parasitoids and a minute native egg parasitoid of *Helicoverpa*. This work is intended to lead to more effective control by parasitoids, and to therefore reduce the amount of chemical spraying currently used to control *Helicoverpa*.

Establishment of exotics

Two small wasp parasitoids, *Cotesia kazak* (Telenga) (Braconidae) and *Hyposoter didymator* (Thunberg) (Ichneumonidae) have been introduced to Australia in recent years to control *Helicoverpa*. *Cotesia kazak* is regarded as a major parasite of *H. armigera* in southern Europe (Carl 1978) and *H. didymator* is effective in controlling *H. armigera* in Israel (Gerling 1969). Both parasitoids were collected in Greece and supplied by the Commonwealth Institute of Biological Control to the Western Australian Department of Agriculture in November and December 1983. Releases then commenced into irrigated crops in the south-west of Western

Australia. Establishment subsequently occurred and both species were recovered from the field in the late 1980s. Using the progeny of these field recovered specimens laboratory colonies were commenced at IPS and the Queensland Department of Primary Industries, Toowoomba (D. Murray, pers. comm.).

In order to rear these parasitoids it is necessary to maintain a host colony, and at IPS we use *H. punctigera.* Moths are housed in plastic buckets which are covered by a cotton sheet onto which eggs are laid. The eggs are collected daily by washing them from the sheets, are allowed to dry and then sprinkled over a tray of artificial diet. Larvae hatch in a few days and are mass reared until the second to third instar, at which time they are either used as parasitoid hosts or are reared individually for host colony propagation. The host colony larvae pupate after six instars, and the pupae are collected and placed in buckets where the emerging moths mate and lay eggs.

Young larvae used as parasitoid hosts are supplied to the wasps on trays of artificial diet. A tray of about 150 larvae is introduced daily to each wasp cage and exposed for six to seven hours. The trays are then removed, sealed with "breathable" paper and incubated at 25°C for 10 days, by which time wasp cocoons have formed. These are collected and placed in plastic vials for adult emergence. Other hosts on which we have successfully reared *H. didymator* are *H. armigera*,the cutworm *Agrotis infusa* (Boisduval), and the armyworms *Persectania ewingii* (Westwood) and *Mythimna convecta* (Walker), whereas the only other successful host for *C. kazak* has been *H. armigera.*

Our first releases of both parasitoids were during spring and summer of 1991-92, as shown below.

PARASITOID	RELEASE SITE	NUMBER	DATE
H. didymator	20 km SW Swan Hill, Vic.	2,300	Oct.-Dec. 1991
	Bacchus Marsh, Vic.	1,000	Jan. 1992
C. kazak	20km SW Swan Hill, Vic.	1,000	Jan. 1992

Parasitoids were released on organic farms into irrigated lucerne crops which grow vigorously and support populations of heliothis throughout the summer when many other crops have dried off or been harvested. These sites were therefore thought to provide the greatest potential for parasitoid establishment. In central and southern Queensland, releases were made during the same seasons (D. Murray, pers. comm.). All release sites are being monitored to determine if establishment has occurred.

Trichogramma: a native egg parasitoid

The minute native egg parasitoid, *Trichogramma* nr. *ivelae* (Pang & Chen), was collected in *Helicoverpa* eggs from field pea and tomato crops in north-west and central Victoria, respectively, in 1991 and 1992. We are investigating its status and potential as a biocontrol agent against *Helicoverpa* in small, high value crops such as processing tomatoes. This involves determining its seasonal abundance, host range and other aspects of its biology, such as effect of temperature on development. Although some years away yet, it is intended that large

numbers are released at the time of moth egg-laying to supplement natural populations and as an alternative to chemical applications. Such releases currently occur in the U.S.A. (Morrison, *et al.* 1978, Oatman, *et al.* 1983).

We are maintaining a colony of *Trichogramma* on eggs of the potato tuber moth, *Phthorimaea operculella* (Zeller) (Gelechiidae), as we have a readily available supply. However, we are currently in the process of changing to a new host, the Angoumois grain moth, *Sitotroga cerealella* (Olivier), as this will allow at least a ten fold increase in production of *Trichogramma*, due to the greater number of eggs produced by *Sitotroga*. Wasps are reared by exposing host eggs on paper sheets to adults. Using her ovipositor, the female lays one or two eggs inside the host egg, and the parasitoid develops inside, consuming the egg contents and emerging as a reproductively mature adult after about 10 days at 25°C.

Other areas of current research are the effect of insecticides on *Trichogramma* and the potential of using artificial diets as a rearing medium.

Acknowledgments

I thank K. Phillips, S. Howe and J. Bentley for maintenance of host and parasitoid colonies. This work is funded by the Victorian State Government Agricultural Strategy.

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BOOK REVIEW

A guide to the Genera of BEETLES OF SOUTH AUSTRALIA Part 6 Polyphaga: Lymexyloidea, Cleroidea and Cucujoidea. By E. G. Matthews

Special Educational Bulletin Series (No. 9), South Australian Museum, Adelaide, 1992, 75 pp. Order from The Museum Shop, South Australian Museum, North Terrace, Adelaide, S.A. 5000. RRP $11.95 plus $2.50 postage and packing; sets of Parts 1-6 at $45.00 plus $8.00 postage and packing.

This is the sixth part of the popular beetle series of guides which attempts to illustrate the diversity of these animals to the beginner, naturalist and professional. The emphasis of this series of Bulletins, as noted in the Forward to Part 1, is on pictures, and picture-keys to make the user's task as easy as possible. Larger beetles can often be identified simply by comparing the specimen with the photographs and the smaller ones by comparing with the dorsal view drawings. The present part covers 28 families and 140 genera including the most taxonomically diverse and difficult superfamily the Cucujoidea.

A brief Introduction assists the reader by explaining the scope of the work, the method of using the keys, taxonomic arrangement and the convention adopted in the pages following. The next section is the taxonomic arrangement under each superfamily and family. For each family a brief account is given of major diagnostic characters (a conspectus of major characters for each family is given separately in Key section) followed by general remarks on distribution in Australia and South Australia, notes on general habitats, biology and economic importance for some of the common genera and species with references to appropriate figures or plates in the following section, and a mention of significant relevant references to assist the serious beetle enthusiast.

The major strength of this work, indeed the Series, is in its simple, easy to use illustrated keys to subfamilies and genera. Descriptive words and figures used in the keys are straightforward and easily understood even by the non-specialist. While keying out, one makes a choice between the two alternatives presented (rarely three) by comparing the words and figures with the specimen until one comes to a dead end and a generic name. These names are usually followed by figure numbers and the figure is then compared with the specimen for confirmation. The figures are either dorsal view drawings (by the author) if the insect is smaller than about 4 mm, or black & white dorsal view photographs of museum specimens (by Jan Forrest) if the species is larger than about 4 mm. During this review I attempted keying out a few common beetles in the larger families of Coccinellidae, Nitidulidae and Cleridae and they reached the correct genera without hitches.

The work ends with a useful index to the taxa included in the book. Plant names have been indexed although incompletely, for example *Eucalyptus* appears not just on page 9 as in index but also on pages 3 and 8. Names of non-insects, such as the spider *Servea* are not included in the index.

Correction: p. 21 (plate 1) - *Acanthocnemis* should be *Acanthocnemus*.

Although the title implies that the fauna treated here is South Australian, only about 1% of the genera treated in the work are more or less restricted to South Australia. About 33% of the genera are Australasian, 9% are Bassian, 34% Pantropical and about 3% Gondwanan. Hence this work is of significant value to workers outside South Australia.

I have a general comment to make. The author has omitted parentheses around the scientific names of species in this part and indeed the series of guides. His justification for this action "it avoids a complication which has become largely redundant at the present time because practically every name requires parentheses" will probably not be appreciated by many beetle workers.

The cover depicts an excellent colour illustration of the clerid *Trogodendron fasciculatum* by Kathy Bowshall-Hill, the biology and behaviour of which we have learnt through reading recent issues of the *Victorian Entomologist*.

The high standard of production of the previous parts is maintained. All in all this is a very valuable work, not only for beetle specialists but also for heginners and naturalists who are interested in the diversity of these fascinating Australian beetles. With its modest price, the work will be appealing to any one interested in animal diversity.

M. Malipatil
Institute of Plant Sciences

RECENT ARTICLES OF INTEREST

Compiled by Ian Faithfull, 7/20 Adam Street, Burnley, Vic., 3121

Burns, G.G. & Burns, A.J., 1992. **The distribution of the Victorian jewel beetles (Coleoptera: Buprestidae) - an ENTRECS project.** *Occasional Papers of the Museum of Victoria 5:1-53.* Complete checklist of the state's 300 buprestids, distribution maps for 284 species, 183 references. ENTRECS is a Society project and this is the second major contribution to it. 5735 specimen, literature or field observation records are mapped on a 10 x 10 minute grid basis, the earliest record being from Prahran in October 1865. Buprestids have been recorded from less than half the grid squares in the state. *Castiarina sexplagiata* occurs in more grids than any other species.

Boulton, A.J. & Lake, P.S., 1992. **The macroinvertebrate assemblages in pools and riffles in two intermittent streams (Werribee and Lerderderg Rivers, southern central Victoria).** *Occ.Papers Mus.Vic.*5:55-71. Upper reaches, sampling by suction samplers and sweep nets, 258 taxa recorded incl. 5 Ephemeroptera, 5 Odonata, 15 Plecoptera, 9 Hemiptera, 64 Coleoptera, 89 Diptera, 29 Trichoptera. Species assigned to feeding groups (predator, collector-filterer, etc.), habitat analysis.

Dean, J.C. & Cartwright, D.I., 1992. **Plecoptera, Ephemeroptera and Trichoptera of the Pelion Valley, Tasmanian World Heritage Area.** *Occ.Papers Museum of Vic. 5:73-9.* Cradle Mt.-Lake St Clair National Park. 17 spp.Plec., 13 Ephem., 50 Trichop. Distribution patterns discussed. *Eusthenia reticulata* the rarest. One unidentif.sp.

Neboiss, A., 1992. *Illustrated Keys to the Families and Genera of Australian Trichoptera I. Adults.* Australian Society for Limnology Special Publication No.9. 87 pp. Available from Dr R.Marchant, Secretary ASL, Dept.Survey, Museum of Victoria.

Hawkeswood, T.J., 1992. **Some observations on the biology of the Australian butterfly *Acraea andromacha andromacha* (Fabricius).** *Spixiana* 14:301-8. *Passiflora suberosa* recorded as foodplant. Number of eggs, pupal duration, emergence time, parasitoid *Winthemia neowinthemioides*, predators *Thomisus spectabilis, Nephila edulis.*

Hawkeswood, T.J., 1992. **Review of the biology and host plants of the Australian jewel beetle *Agrilus australasiae* Laporte & Gury.** *Spixiana* 15:81-7. A common species in SE Aust.

Green, G., 1992. **Butterfly buddies.** *Gardening Australia*, July, 72-5. Details of program in Lismore, NSW, to save the Richmond Birdwing, *Ornithoptera richmondia*, by planting *Aristolochia* propagated in a local co-op nursery, fund raising, tissue culture of food plants, etc.

ABC Television *Quantum* 26 August 1992. A species of Australian ambrosia beetle (Curculionidae: Platypodinae) forming colonies consisting of queens and nonbreeding females is reported to be the first eusocial beetle to be identified. Colonies up to 40 years old are formed in living eucalypts. Eusociality involves colonies with few reproductive females and sterile progeny which do the work needed in colony maintenance and brood rearing, bees and termites being the best known. Recently the Naked Mole Rat has been identified as the first eusocial mammal.

EXCURSION TO THE GRAMPIANS

Date: October 31 and November 1 (optional till 3rd)

Accommodation: Grampians Gardens Caravan Park, just before Halls Gap, cnr Stawell & Ararat Roads. Phone (053) 56 4244. On-site vans & Cabins, take own linen. Shop - food, ice, petrol. **Please make your own bookings.** Price of double ranges $25 - 35 per night. Other motels at Halls gap.

Transport: If you can offer or require, phone Peter Carwardine. Approx. 260 km via Ararat & Pomonal.

Excursion: Will depart Halls Gap P.O. 12.00 Saturday. Probable excursion areas will be Reeds and Boroka Lookouts. Message will be left at P.O. Shop for latecomers.

Food: Cafe & Take-away available Halls Gap & Ararat. Take drinking water container.

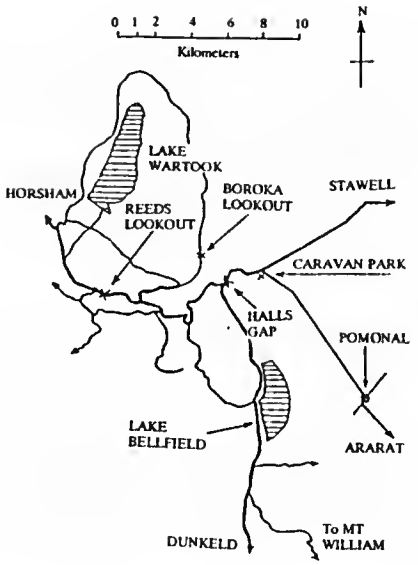
Maps: Broadbent No. 205 The Grampians.
Natmap 1:100 000 GRAMPIANS also ARARAT.

Police: Ararat 52 2233 Stawell 58 2233.

Doctor: Ararat Medical Centre 55 High Street 52 2311.

Enquiries: Peter Carwardine 571 8958 all hours. NOTE - Members who wish to attend hut will not be at October General Meeting would please phone Peter a few days before meeting.

(see map next page)



GRAPEVINE

Kelvyn Dunn recently joined forces with Prof. Roger Kitching and Elsa Dexter at Griffith Unvierstiy, Nathan, to work on the conservation of Australia's vulnerable butterflies. Despite relocation to Brisbane, Kelvyn intends to continue serving the Society as joint Editor with Mali Malipatil. Those intending to submit articles for inclusion in the *Victorian Entomologist* should continue to send material to Mali at the Institute of Plant Sciences, Burnley.

Michael Braby has been busy with the conservation of tropical paperbark woodlands in the Cardwell area of far northern Queensland. He recently appeared on local radio and has given public slide shows to publicise the matter. In September Michael gave a presentation to the *Wildlife Preservation Society of Queensland* where he drew the attention of local members to the immediate need to conserve these dwindling habitats. Michael explained that much of the habitat of the two rare and beautiful butterflies the "Cooktown Azure" and "Apollo Jewel" had been destroyed within the last couple of years. Attention was also given to the matter in the August issue of the *News Bulletin of the Entomological Society of Queensland* where Michael mentioned the present six month suspension of the clearing after the discovery of the Mahogany glider possum's presence in these woodlands.

ACTION IS NEEDED: Please write to support Michael's campaign to cease further destruction of paperbark woodlands near Cardwell and so preserve a small remnant of State Forest lands for these rarer insects (and the glider possum). Write to the following ministers ASAP pointing out the importance of maintaining small corridors of natural habitat within the already proposed pine forest plantations and that a biological survey/resource assessment should be undertaken before any new areas of native vegetation are cleared in Queensland,

The Hon. E. Casey
Minister for Primary Industries
GPO Box 46
BRISBANE QLD 4001

The Hon. P. Comben
Minister of Environment and Heritage
PO Box 155
NORTH QUAY QLD 4002

OFFICE BEARERS

CONTRIBUTIONS TO THE *VICTORIAN ENTOMOLOGIST*

The Society welcomes contributions of articles, papers or notes pertaining to any aspect of entomology for publication in this Bulletin. Contributions are not restricted to members but are invited from all who have an interest. Material submitted should be responsible and original. Statements and opinions expressed are the responsibility of the respective authors and do not necessarily reflect the policies of the Society.

Contributions may be typed on A4 paper or *preferably* sent on an **IBM formatted disk in *WordPerfect*** or other word processing package (clearly specified) with an enclosed hard copy print out. Urgent submissions may be faxed.

The deadline for each issue is the final Friday of each odd month.

ADVERTISING

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20 November - Council Meeting

11 December - Members Night
Members to bring exhibits for discussion

Scientific names contained in this document are *not* intended for permanent scientific record, and are not published for the purposes of nomenclature within the meaning of the *International Code of Zoological Nomenclature*, Article 8(b). Contributions are not refereed, and authors alone are responsible for the views expressed.